MILCOM98 Abstract

Title: A Highly Miniaturized, Battery Operated, Commandable, Digital Wireless Camera

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This paper will discuss the design, development, testing, and demonstration a highly miniaturized, battery operated, commandable, digital wireless camera that is being developed under funding from the Defense Advanced Research Projects Agency (DARPA). The camera uses a complementary metal-oxide-semiconductor (CMOS) active pixel image sensor (APS) that achieves noise performance comparable to a charge-coupled device (CCD) with orders of magnitude better power consumption performance. The APS image sensor technology is integrated with ultra-low power on-chip analog-to-digital conversion circuits and a wireless communications transceiver and antennas. A tiny (e.g. 1 inch cube goal) camera will be discussed that operates from a small battery, receives wireless commands to take one or more frames of data, and broadcasts the digital image data to a remote receiver. The communication system operates over a one kilometer range with a UHF command link operating at 1 kbps and a spread spectrum S-band (Industrial, Scientific and Medical-ISM band) digital image data link operating at 2.5 Mbps. This paper will present the results of a three year development effort that will be concluded in April 1998 with the deliver of the miniature wireless camera to DARPA. The wireless camera is scheduled to be field tested in June 1998 with the United States Marine Corps and a variety of DoD and other government agencies have expressed interest in the technology for surveillance, monitoring, and tactical applications. This paper will necessarily emphasize the communication system design and development, but will also provide a high level overview of the imaging sensor and the system level operation of the wireless camera.